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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/516,370	12/01/2004	Vincent Andrei Handerek	033277-014	4843
21839	7590	04/17/2006	EXAMINER	
BUCHANAN INGERSOLL PC (INCLUDING BURNS, DOANE, SWECKER & MATHIS) POST OFFICE BOX 1404 ALEXANDRIA, VA 22313-1404			SCHWARTZ, JORDAN MARC	
			ART UNIT	PAPER NUMBER
			2873	

DATE MAILED: 04/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/516,370

Applicant(s)

HANDEREK ET AL.

Examiner

Jordan M. Schwartz

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 2 and 4-20 is/are rejected.
- 7) ☒ Claim(s) 3 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 December 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☒ Certified copies of the priority documents have been received in Application No. PCT/GB04/03652.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |  |  |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>12/04, 2/06</u> | 6) <input type="checkbox"/> Other: ____  |

## **DETAILED ACTION**

### ***Priority***

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. PCT/GB04/03652, filed on August 27, 2004.

### ***Specification***

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

#### **BACKGROUND OF THE INVENTION.**

(1) Field of the Invention.

(2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.

#### **BRIEF SUMMARY OF THE INVENTION.**

#### **BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).**

#### **DETAILED DESCRIPTION OF THE INVENTION.**

### ***Claim Objections***

Claims 11 and 15 are objected to for the following reason. Since the intended meaning could be determined from the specification and Figures, a 112 rejection has not been made but instead this lack of clarity issue is being raised in the following objection.

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With respect to claims 11 and 15, that part of the claim stating “and through which a radiation beam passes to be retroreflected” creates a lack of clarity because applicant has not positively and distinctly claimed that the radiation beam passes through a boundary of the transparent material to be retroreflected creating a lack of clarity. For additional clarity it is suggested that applicant claim “according to Claim 1, having a boundary of the transparent material remote from said lens through which a radiation beam passes to be retroreflected, wherein said boundary is defined by a substantially...”.

***Claim Rejections - 35 USC § 112***

Claims 6-7, 12-14, 19-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With reference to claims 6-7, applicant is claiming “a ratio... between 1 and 2” and the intended meaning is not clear rendering the claims vague and indefinite. Specifically, it is not clear if applicant means that the ratio is 1:2 or if applicant means that the ratio is between 1:1 and 1:2 (the latter being the assumed meaning) and the lack of clarity renders the claims vague and indefinite.

With respect to claims 12-14, the claimed “wherein said substantially spherical reflective surface” lacks an antecedent basis. It is not clear if the dependency of the claims is incorrect or if in each of these claims applicant intended to claim “wherein said reflective part includes a substantially spherical reflective surface and wherein said substantially spherical reflective surface...” and the lack of clarity renders the claims

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vague and indefinite. For purposes of examination it is assumed that claim 11 meant to depend from claim 10 (and not from claim 1) and therefore claims 12-14 which eventually each depend from claim 11 will have antecedent basis for both the claimed "substantially spherical reflective surface" and the claimed "substantially spherical transparent surface".

With respect to claims 19-20, the claimed "substantially spherical transparent surface" lacks an antecedent basis. It is not clear if the dependency of the claims is incorrect or if in each of these claims applicant intended to claim "wherein said non-gaseous transparent material includes a substantially spherical transparent surface and wherein..." and the lack of clarity renders the claims vague and indefinite. For purposes of examination it is assumed that claims 19-20 each meant to depend from claim 11 and that claim 11 meant to depend from claim 10 thereby providing antecedent basis for both the claimed "substantially spherical reflective surface" and the claimed "substantially spherical transparent surface".

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 8, and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Florczak et al patent number 6,288,842.

Florczak et al reads on these claims by disclosing the limitations therein including the following: a retroreflective device (column 1, line 24 to column 2, line 30, column 10, line 30, Figure 9); comprising a substantially spherical lens (Figures 1-2 and 9, lenses "12"); that the substantially spherical lenses can have a graded index of refraction (column 4, lines 45-48); a reflective part for retroreflecting a radiation beam passing through the graded refractive index lens (column 1, line 24 to column 2, line 30, column 10, line 30, Figure 9); and at least partly surrounding the lens, a non-gaseous transparent material having a substantially uniform refractive index (Figure 1, column 4, line 1 re binder layer "14", Figure 2, column 4, line 14, transparent protective overcoat "24", or Figure 9, the corresponding binder layer to Figure 1 in which the microlenses are embedded). Florczak et al further discloses the transparent material surrounds at least approximately one half of the lens (Figure 1, column 4, line 1 re binder layer "14", Figure 2, column 4, line 14, transparent protective overcoat "24" as the transparent material, and Figure 9, the binder layer in which the microlenses are embedded and all depicted in the Figures as surrounding at least approximately one half of the lens); and the reflective part including a substantially spherical reflective surface arranged concentrically with respect to the graded refractive index spherical lenses (Figure 9, the reflective surface adjacent to the microlenses).

Claims 1-2, 4, 8-11, 13, 18, and 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Liang et al publication number 2004/0212882.

Liang et al reads on these claims by disclosing the limitations therein including the following: a retroreflective device (Figures 3, 8A, 8B, 10 and 15A, paragraph 0100); comprising a substantially spherical lens (Figure 3 and 15A, paragraphs 0082 and 0100); that the substantially spherical lenses can have a graded index of refraction (paragraph 0082, figure 15A); a reflective part for retroreflecting a radiation beam passing through the graded refractive index lens (Figures 8A, 8B and 10, paragraph 0100 re the retroreflective surface); and at least partly surrounding the lens, a non-gaseous transparent material having a substantially uniform refractive index (Figure 15A, paragraph 0082 re either or both of the meniscus lenses surrounding the ball lens as the "transparent material having a substantially uniform refractive index"). Liang et al further discloses the graded refractive index lens having a gradually varying, spherically symmetric refractive index distribution (Figure 17, paragraph 0087); the refractive index at the center greater than the refractive index at the outer surface (Figure 17); transparent material surrounds at least approximately one half of the lens (Figure 15A); at least part of the transparent material located between the graded index lens and the reflective part (Figures 8A, 8B, 10 and 15A, paragraph 0100 with the reflective part as the retroreflective mirror and the transparent part as one or both of the meniscus lenses surrounding the graded index spherical lens); the reflective part including a substantially spherical reflective surface arranged concentrically with the graded index lens (paragraph 0100); having a boundary of the transparent material remote from said lens through which a radiation beam passes to be retroreflected (Figure 15A re the boundary of either or both meniscus lenses remote from the spherical graded index lens): wherein

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said boundary is defined by a substantially spherical transparent surface arranged concentrically with respect to the graded index lenses (Figure 15A); the substantially spherical and substantially spherical transparent surface having different radii (Figures 8A, 8B, 10, 15A, paragraph 0100 since it is not claimed that they have identical radii then presumably they will have different radii); and the graded refractive lens having a refractive index distribution which averages across a radial cross-section between 1.4 and 1.8 (Figure 17).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5-7 and 16-17 rejected under 35 U.S.C. 103(a) as being unpatentable over Liang et al publication number 2004/0212882.

With respect to claims 5-6, Liang et al discloses as is set forth above including disclosing the refractive index of the graded index lens at its outer surface of approximately 1.52 (see figure 17) but does not specifically disclose the transparent material having a refractive index less than 1.52 or the ratio between 1:1 to 1:2. However, Liang et al teaches that the meniscus lenses i.e. the transparent material can be made of glass, plastic, or other suitable refractive materials and to minimize spherical and chromatic aberrations (paragraphs 0076-0077, 0082). The examiner



takes Judicial notice that it is well known in the art of lenses to have either plastic or glass lenses formed of materials having an index of refraction between 1.4 and 1.52 i.e. less than 1.52 to provide the required refractive and aberration correcting properties within the lens system. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the meniscus lenses of Liang et al as formed of a material having an index of refraction of between 1.4 and 1.52 i.e. less than 1.52 since it is well known in the art of lenses to have either plastic or glass lenses formed of materials having an index of refraction within this range to provide the required refractive and aberration correcting properties within the lens system. Furthermore, having an index of refraction less than 1.52 such as within the range of 1.4 to 1.51 would inherently provide a ratio between 1:1 and 1:2 as claimed.

With respect to claim 7 and 17, Liang et al discloses as is set forth above including disclosing the refractive index of the graded index lens at its center of approximately 1.6 (see figure 17) but does not specifically disclose the transparent material having a refractive index between 1.3 and 1.6 i.e. within the ratio as claimed between 1:1 and 1.2 and being greater than 1.3. However, Liang et al teaches that the meniscus lenses i.e. the transparent material can be made of glass, plastic, or other suitable refractive materials and to minimize spherical and chromatic aberrations (paragraphs 0076-0077, 0082). The examiner takes Judicial notice that it is well known in the art of lenses to have either plastic or glass lenses formed of materials having an index of refraction of approximately 1.4-1.6 to provide the required refractive and aberration correcting properties within the lens system. Therefore, it would have been

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obvious to a person of ordinary skill in the art at the time the invention was made to have the meniscus lenses of Liang et al as formed of a material having an index of refraction of between 1.4 and 1.6 i.e. within the claimed ratio of 1:1 to 1:2 and greater than 1.3 since it is well known in the art of lenses to have either plastic or glass lenses formed of materials having an index of refraction within this range to provide the required refractive and aberration correcting properties within the lens system.

With respect to claim 16, Liang et al discloses as is set forth above including the transparent material as a solid component (Figure 15A i.e. either one of the meniscus lenses) but does not specifically disclose the meniscus lenses formed of molding. The examiner takes Judicial Notice that it is well known in the art of optical lenses to form lenses such as meniscus lenses by molding for the purpose of providing an efficient means of forming lenses of improved optical performance. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have either of the meniscus lenses of Liang, i.e. the transparent material, formed of molding since it is well known in the art of optical lenses to form such lenses by molding for the purpose of providing an efficient means of forming lenses of improved optical performance.

Claims 1-2, 4, 8-15, and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over PCT WO 97/23423 (herein referred to as "PCT'423) in view of Suzuki et al patent number 4,848,882.

PCT'423 discloses the limitations therein including the following: a retroreflective device (page 1, first paragraph); comprising a substantially spherical lens (Figures 1-2,

"1" page 1, line 5); a reflective part for retroreflecting a radiation beam passing through the graded refractive index lens (Figures 1-2); and at least partly surrounding the lens, a non-gaseous transparent material having a substantially uniform refractive index (Figures 1-2, either "2", "5" or "7" as the transparent material).

PCT'423 discloses as is set forth above but apparently discloses the spherical lenses of uniform index of refraction and not of a graded index of refraction as claimed. Suzuki et al teaches that in a retroreflective device using a spherical lens with a reflective surface attached thereto (Figure 7) that it is desirable for the spherical lens to be formed of a graded index of refraction for the purpose of providing improved aberration correction (Figure 7, column 1, lines 40-49, column 3, line 53). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the spherical lens of PCT'423 formed of a graded index of refraction since Suzuki et al teaches that a retroreflective device using a spherical lens with a reflective surface attached thereto that it is desirable for the spherical lens to be formed of a graded index of refraction for the purpose of providing improved aberration correction.

With respect to claims 2, 4 and 18, PCT'423 and Suzuki disclose and teach as is set forth above and Suzuki further teaches that graded refractive index can be a gradually varying spherical symmetric index distribution with a greater refractive index at the center than at the outer surface and averaging between 1.4 and 1.8 for the purpose of providing a spherical lens of improved aberration correction (column 1, line 40 to column 2, line 22, column 3, line 53, figure 2B). Therefore, it would have been obvious

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to a person of ordinary skill in the art at the time the invention was made to have the spherical lens of PCT'423 as modified by Suzuki as further having a gradually varying spherical symmetric index distribution with a greater refractive index at the center than at the outer surface and averaging between 1.4 and 1.8 since Suzuki further teaches of such a graded index distribution for the purpose of providing a spherical lens of improved aberration correction.

PCT'423 further discloses the transparent material surrounds at least approximately one half of the lens (Figures 1 and 2); at least part of the transparent material located between the graded index lens and the reflective part (Figures 1 or 2 with "2" as the transparent material); the reflective part including a substantially spherical reflective surface arranged concentrically with the graded index lens (Figure 2, "6"); having a boundary of the transparent material remote from said lens through which a radiation beam passes to be retroreflected wherein said boundary is defined by a substantially spherical transparent surface arranged concentrically with respect to the graded index lenses (Figures 1 or 2 with "2" as the transparent material); the substantially spherical and substantially spherical transparent surface having substantially the same radii (Figure 2 with "2" as the transparent material); the substantially spherical and substantially spherical transparent surface having different radii (Figure 1 or 2 with "5" or "7" as the transparent material); the reflective surface has a smaller radius of curvature than the transparent surface (Figure 2 with "5" or "7" as the transparent surface and "6" as the reflective surface); the claimed remote boundary of

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the transparent surface as planar (Figures 1 or 2 with "5" as the transparent surface);  
and the transparent material with an index greater than 1.3 (page 1, lines 5-16).

***Allowable Subject Matter***

Claim 3 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: with respect to the allowable subject matter, none of the prior art either alone or in combination disclose or teach of the claimed combination of limitations to warrant a rejection under 35 USC 102 or 103. Specifically, with respect to claim 3, none of the prior art either alone or in combination disclose or teach of the claimed retroreflective device specifically including, as the distinguishing feature in combination with the other limitations, the claimed refractive index distribution including parts having at least two separate radial extents within which the material of the lens has a continuously varying refractive index and the refractive index variation having a gradient discontinuity between the two radial extents.

***Prior Art Citations***

Kelleher patent number 2,866,971 and Mori patent number 6,461,718 would have read on or made obvious a number of the above rejected claims, however, such rejections would have been repetitive.

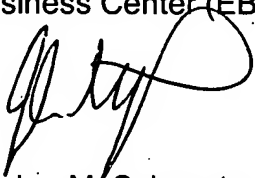
***Conclusion***

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jordan M. Schwartz whose telephone number is (571) 272-2337. The examiner can normally be reached on Monday to Friday from 8:00 to 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Mack can be reached on (571) 272-2333. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jordan M. Schwartz  
Primary Examiner  
Art Unit 2873  
April 13, 2006